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ABSTRACT

A social studies educator examines energy education and its place in the curriculum, discussing what should be taught, where, and by whom. Six recommendations are made. First, students must be made aware that sometime between now and the year 2000, world demand for oil and natural gas will actually exceed world supply. Life in the 21st Century will run on something other than oil. Preparations must begin now to make the shift in an orderly manner. Second, we must help students understand that we are dealing with a global problem of massive proportions. A part of the global nature of the present energy situation has to do with the distribution of production and consumption patterns. The United States is the world's leading oil consumer, the Soviet Union is the largest producer, and the Middle East is the holder of the largest reserves. The developed nations of the world literally run on oil, the majority of which they import from less developed nations. Such global imbalance in production and consumption patterns result in a webb of interdependencies never before experienced by the planet's inhabitants. Third, energy education should focus upon the broader aspects of our energy situation as well as upon what individuals can do. The fourth recommendation is that energy education should give systematic attention to fundamental choices which confront us. Fifth, energy education should occur throughout the curriculum, but the focus should vary with the grade level. Science educators should concentrate upon the scientific aspects of energy education and social studies teachers should focus upon the social implications of the present situation. In grades 1-6, energy education should be structured around three themes: the nature of energy and its role in our daily lives; lifestyle implications of the new energy ethic; and how conservation does not necessarily mean doing with less, just doing differently. The sixth and final recommendation is that whenever possible, school systems should locate and adapt existing energy education materials rather than invent their own.
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ENERGY EDUCATION FROM THE PERSPECTIVE OF A SOCIAL STUDIES EDUCATOR

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Introduction

During the dark and cold of the winter of 1973, Americans were introduced to the term, energy crisis, in a very real way. In fact, since then, the word "energy" seldom appears without "crisis" as the trailer. The extent of the world's interdependence was hammered home when a small war (by conventional standards) half way around the world from the United States resulted in a 400 percent increase in the price of oil, and though we didn't know it then, that was only the beginning. Crude oil that sold for $2 a barrel in 1972 was to skyrocket to $32 a barrel by 1980. But in the final days of 1973, few Americans realized that they were witnessing the first act in a drama that will occupy the world's attention for the next quarter of a century; and in the process, pose the greatest threat to world peace since World War II.

Four years later, the Carter administration acknowledged the fundamental changes the nation was about to undertake, a situation which the President set before the nation in a nationally televised speech. Congress was slower to confront the politically unpopular choices but eventually managed to pass major portions of the President's energy package. The scenario outlined by some of those who had formed the "early warning system" was under way (Yergin, 1978).

As has been the case with other national "crises," the nation turned to the schools to help solve this latest national problem. National energy conferences for educators were held, the National Science Foundation and numerous state departments of education initiated curriculum development projects and professional journals published articles calling for action on the energy education front.

The general public was slower to recognize the nature and implications of the transition which lay ahead. Mis-information, confusing signals from public officials, and an understandable tendency to ignore some very fundamental and difficult choices resulted in wild swings in the public's concern over the energy issue and led Rosa (1978) to conclude:

> A straightforward interpretation of our trend data is that the seriousness of the energy problem is only weakly accepted by the American public; it is only when the American public has received dramatic reminders of the problem that grave concern has been expressed in the polls. (p. 7)

Though teachers seemed more concerned, they shared the general public's lack of information about our energy situation (Marker, 1980). A CBS poll in 1977 found that fewer than 50 percent of Americans knew that we imported any oil; fewer than one in ten knew that our dependency was then over 40 percent and growing.

One can speculate that Americans are increasingly aware of the particulars of the energy situation in which we find ourselves. To the media's credit they have continued to place the issue before us though, as Hanvey (1975) has observed, they find it difficult to provide sustained attention to the topic. But if the level of mis-information has decreased, the level of skepticism has not, at least not as much. If one can judge by the views expressed in letters-to-the-editor, TV talk shows, and the like; a large number of people still believe that the energy "crisis" has been created by big oil, big government, greedy Arabs, misguided environmentalist, or whatever. Such beliefs remove the necessity to admit that the world faces a major transition from oil to some other form of energy and allows one to believe that if the culprits were just caught or exposed our problems would be over. To admit that we face a major shift in energy sources is to accept the fact

that we also face a major change in our life style. Even so, one suspects that the simplistic explanations of the current energy situation are more a function of insufficient and mis-information than of the desire to rationalize a fundamental problem. Whatever its cause, a high level of skepticism about whether or not we have an energy "problem" is a situation which schools must take into account as they consider the issue of energy education.

The School's Dilemma

Demands by the public that the schools "do something to help solve the energy crisis" take their place at the end of a long line. When the Soviets beat us into space we responded with a crash program to upgrade school science programs. Since then, we have witnessed multicultural education, law-related education, drug education, parenthood education, global education, consumer education, moral education; the list seems endless. It is simple, if not expensive, for policy makers to add another item to the school's list of responsibilities. It is quite another thing for the schools to figure out how to implement such mandates.

It is not clear where potentially interdisciplinary issues like energy education should be placed in the curriculum. Computing heat loss, understanding the process for converting coal into gas or oil, figuring the size solar collectors needed to provide heat for a home, and computing the conversion loss as coal is turned into electrical power are all examples of energy topics that sound like science. On the other hand, studying the impact of the shift from wood as a major source of power to a coal based economy and from that study trying to speculate about the impact our own transition will have sounds like social studies. Is the nuclear power debate mainly over the science of how one produces such power or is it a matter of deciding which

public policy produces the greatest good for the greatest number? Is it the school's responsibility to help students become wise consumers of energy or should the focus be on more theoretical matters? How one answers these types of questions has much to do with where energy education is placed in the curriculum. To avoid such issues by asserting that energy education is everyone's responsibility is probably to make it no one's responsibility.

Like its placement in the curriculum, the form which energy education is to take also presents the schools with difficult choices. Should it be primarily an advocacy curriculum stressing the need for conservation or emphasizing our moral responsibility, with only 6 percent of the world's population, to use less than our current thirty percent of the world's energy? An alternative is to help students understand the choices which confront us, be they foreign policy alternatives or choices among forms of energy, rate structures, etc.[1] One must also consider how long a view to take. One alternative is to focus upon the short term choices which will get us through the 1980's and early 1990's by featuring issues such as; do we use grain for fuel or food, deregulate energy prices, use tax incentives and penalties to shape consumer demand? The long term path would focus instead upon choices like those outlined by Commoner (1979) when he argues for a solar-methane based, decentralized system as opposed to highly centralized, electricity based system.

There are no easily apparent answers to such fundamental choices. In a centralized society, the government would decide and schools would follow. Happily, in our system, local school districts must decide for themselves. One of the central points of this paper is that social studies educators should realize that such choices are there and that they realize the implications

of selecting a particular alternative. The next section of this paper sets forth this writer's position on such issues.

What Should We Do? Some Recommendations

The fact that the call for energy education is relatively recent means that many social studies educators are still in the process of formulating their position on the matter. Without question, it will become increasingly difficult for schools to ignore the energy issue since it is such a fundamental part of the American life style. Our society long ago played out its option of depending upon only human and animal power. Crisis is probably not an appropriate term because it implies a short run situation, but crisis is appropriate if taken to mean a situation which, if left unresolved, will result in social and economic disaster.[2]

Obviously human society has survived previous energy transitions but each has been accompanied by major changes in life styles. Thus, the shift from coal to oil made the automobile possible and much has been written detailing how that invention shaped our present society. It is difficult to predict what an oil-less society will be like, especially since it greatly depends upon how planned is the transition to the new energy source. Thus, my first recommendation.

Recommendation #1

> Emphasize the fundamental nature of the transition which lies ahead and the long lead times necessary to make the shift in an orderly manner.

Since many Americans remain skeptical of the claim that we face a genuine shortage of oil and natural gas in the 1980's, it is essential that where ever and when ever energy education occurs that a careful case

be made for the problems which lie ahead. Students cannot be forced to believe that world oil and gas production will soon begin to decline despite our almost frantic efforts to head off such a situation. But they should be knowledgeable about the fact that most experts generally agree on what lies ahead even if they disagree on the details of the picture. Sometime between now and the year 2000, world demand for oil and natural gas will actually exceed world supply. When that happens, the inconveniences caused by previous interruptions and shortages will seem mild in comparison. Insulating homes and building more fuel efficient automobiles will delay this day of reckoning but such efforts cannot change the fact that the world will really begin to feel what it means to run out of oil. When oil production peaked in the United States in the late 1960's, we made up the difference by importing oil from abroad. The world has no such option! Life in the 21st Century will run on something other than oil but between now and then nations will scramble to protect their sources of supply and in the process set the stage for a serious threat to world peace.[3]

It is safe to predict that other sources of energy will replace oil and natural gas, but because those two fuels now account for about 75 percent of our energy, replacing them will take considerable time. It takes ten years to build a new coal powered generating plant, almost fifteen to bring a nuclear plant onto line. Automobiles presently on the road will be around when the real oil shortage begins. Our windowless buildings which must be air conditioned will be with us for many years. Replacing the remnants of our cheap energy society will take many years; and if we wait to begin until the "typical citizen" realizes that we have a problem, we will have used up our most precious resource, "time."

We have a preview of what lies ahead when we look at the shift in capital investments which must occur to produce an amount of liquid fuels from coal, oil shale, and grain which, when compared to our projected needs in 1990 will be a literal "drop in the bucket."[4] Helping students understand the lag time necessary for a society to make a fundamental shift in its energy sources is one of our most pressing needs and the task is made infinitely more difficult when their parents believe we are working on a problem which does not exist.

Recommendation #2

> Help students understand that we are dealing with a global problem of massive proportions.

One of the difficulties of dealing with contemporary problems is that they are so large in scope that they almost defy the imagination, and the present energy situation is no exception. Students might better appreciate the problem of the lag time needed to replace our reliance on oil if they realize that at current rates of consumption, the world must find the equivalent of a new Kuwait every three years and a new North Sea every year and a half just to stay even with world demand ("Energy,..., 1978). Graphic depictions of consumption and use patterns like those which appear in Murray's Energy: A National Issue also help bring home the point.

A two or three percent annual growth in energy consumption seems harmless enough until one realized that such growth doubles consumption every 25 to 35 years, with the amount of energy being consumed during the doubling period being equal to the TOTAL amount of energy consumed previous to the beginning of the doubling period. In short, it is difficult to overstate the magnitude of the problem confronting the nations of the world.

A part of understanding the global nature of the present energy situation has to do with the distribution of production and consumption patterns. The United States is the world's leading oil consumer, the Soviet Union is its largest producer, and the Middle East the holder of its largest reserves. The developed nations of the world literally run on oil, the majority of which they import from less developed nations. Even without political complications, the sheer task of moving large amounts of oil and natural gas from one country to another would present the world with a formidable task.

The movement of massive amounts of energy, primarily oil, from one part of the world to another results from very uneven consumption patterns. If the poorer two-thirds of the earth's population were to disappear tomorrow, world energy consumption would decline by only 10 percent (Brown, 1976). In fact, Keyfitz (1976) argues that the world's growing middle class represents a greater threat to global resources than does the increasing numbers of the world's poor.

Such global imbalance in production and consumption patterns result in a webb of interdependencies never before experienced by the planet's inhabitants. Illiterate villagers in Bangladesh may starve because of a decision by Americans to convert their grain into fuel for their cars rather than export it (Rask, 1980). A revolution in Iran results in a world oil shortage causing American auto workers to be laid off as people rush to buy fuel efficient automobiles from Japan. A homeowner in New England finds the value of his oil heated home diminished by actions taken by OPEC oil ministers months earlier. Life has indeed become increasingly complicated, and interdependent, for the people of the world and because energy is so basic to the way we live, few people in the world have escaped.

It brings new meaning to the notion that "we are all in this together."

Recommendation #3

> Energy education should focus upon the broader aspects of our energy situation as well as upon what individuals can do.

There is an understandable temptation to focus upon those parts of reality that most directly touch us. Thus, our consideration of the energy problem in the United States gets translated into what can be done about those gas lines at service stations? There is a heavy conservation ethic present in energy education materials, as well there should be. It has repeatedly been pointed out that conservation is the quickest and least expensive way to reduce our dependence upon foreign oil (Shipper, 1980 and Stobaugh and Yergin, 1979). However, Hanvey (1975) has cautioned us not to ignore the "surprise effects" of cultural change and the energy situation is a perfect example of why we should heed his advice.

Because we now import over 40 percent of our oil, any interruption in supply means that the amount of liquid fuels quickly falls below demand. The result is gas lines, allocation systems, spot shortages, and even rationing. For the person unable to purchase fuel to get to work, that is crisis enough. But our dependence upon foreign oil produces ripples into other, less apparent, areas of our national life. Thus, we may "solve" our energy problem by importing oil, but in the process we:

- —create a balance-of-payments deficit as dollars shift to the oil exporting countries.
- --weaken our defense posture since our armed forces also run on oil.
- --add additional inflationary pressure to the economy.
- --reduce our foreign policy options as we seek to avoid another oil embargo.

—undermine the value of the dollar on world money markets.

—endanger the large loans made by banks to the developing nations; loans which, if defaulted, would spell disaster to the world banking community.

Thus, by "solving" one problem, we create others which may pose a much greater threat to world peace and stability than not being able to buy all the gasoline we would like.

When we deal with energy in the curriculum, we need to always be alert to what is happening "off camera" as well as with the immediate dilemma.

Recommendation #4

Energy education should give systematic attention to the fundamental choices which confront us.

This recommendation has a special significance for students now in the senior high schools, for it is in the next few years that this country will make some basic decisions which will shape the world they will live in during the 21st Century. For good or ill, energy patterns will be well established by the time students now in the elementary grades begin to think about public policy.

As oil and natural gas become increasingly scarce resources, we face the dilemma of how to fairly allocate them. Do we employ a free market pricing mechanism to determine who gets how much oil and natural gas or do we intervene with allocation systems, controlled prices, rationing, etc.? For example, should an extra tax be placed upon cars with automatic transmissions, air conditioning and other devices which reduce fuel efficiency, or should the production of such cars simply be banned? Should gasoline prices be decontrolled to encourage conservation or should the price be controlled to protect the poor? Is it better to take a state-by-state approach to the

resource allocation problem or have a single national policy? How can public officials be protected from the pressure to do what is politically popular rather than what they believe may be in the national interest?

A closely related fundamental choice has to do with the extent to which we concentrate on increasing supply or reducing demand. This is not an either-or choice but one of degree. Most energy education materials promote a conservation ethic based upon the well accepted notion that the quickest and most efficient way to save energy is simply not to use it.

In an energy wasteful society like ours, substantial savings can indeed be had without changing life styles. Thus, flow restrictors can reduce hot water consumption without eliminating the American daily shower. A home, when insulated, uses up to 40 percent less energy than the same home uninsulated. A family, with two fuel efficient cars is still a two car family. Energy education must make it clear that conservation doesn't always mean moving to a kerosine lighted farm in Vermont. As Shipper (1980) has demonstrated, the "good life" can be had with much less energy than used by Americans.[5] Conservation, which is one area where what individuals do does make a difference, can buy us time to find new, if not more, energy.

Conservation, however, is a temporary measure to help aleviate the energy crunch. Eventually the gas and oil will run out and one can't conserve what isn't available in the first place, as nations running out of wood already know (Eckholm, 1976). Then what?

Much of the debate over alternative energy sources has centered on how we should invest billions in finding other means of producing the gas and oil to which we have geared our economy and life style. But Barry Commoner (1979) and Amory Lovins (1977) say the choice confronting us is much more

fundamental. The key issue is whether we place our capital behind an increasingly centralized (and electric) energy system or a decentralized methane-solar based system. Should we opt for a hard (nuclear) or soft (solar) technology? The billions required by either approach prohibit our walking both paths simultaneously and once part waydown either road, the lag time problem rules out a retreat to the other. The issue is complex and each side marshals its experts and facts. Once either option is selected, it will take years for it to be reflected in the daily lives of our citizens. Grappling with problems still ten to fifteen years into the future will require a more energy literate populace than we now have and yet one must wonder if we can sustain public interest in energy education over such a long period. The history of other "fads" in the curriculum is not encouraging.

The debate over the role of nuclear power is at the heart of any discussion of alternative energy futures. Most energy education materials attempt to deal in some way with the nuclear issue but if one draws upon materials from the media it is almost impossible to find items without a point of view. It might indeed be preferable for teachers to use biased materials from the adult world than to use subtly biased classroom materials which are presented as offering a balanced view. As Hardy (1979) pointed out, the bias can indeed be subtle, to the point that teachers who have only limited knowledge about nuclear power will fail to alert youngsters to what is going on.

Ironically, the nuclear power issue may simply fade over the next two or three decades as that form of power generation becomes less economically competitive. Uranium, like other fossil fules, is a finite resource and as such will become increasingly expensive as supplies become more scarce. We also are only a few years away from the time when power companies must start

decommissioning some of the older nuclear plants. The cost of such moves has not been included when calculating the price of nuclear power and yet someone will have to pay for those operations. Again, as Hanvey (1979) urges, we should look for the "hidden wiring."

Energy educators in the future should try to avoid the nuclear trap in which we currently find ourselves. The nuclear industry, with a large assist from the Atomic Energy Commission, sold nuclear power to this nation while simply ignoring problems such as waste storage and decommissioning costs. By the time such issues surfaced, industry and government had invested such large amounts of money and time in the nuclear option that despite its hazards, we now have little choice but to depend upon it as part of our energy mix for the next two or three decades. Current calls for a massive shift to coal as the fuel of the future should be examined cautiously. Our reliance upon synthetic fuels derived from coal may be well placed, but if not, it will be years before those programs can be undone, which is all the more reason we should focus students' attention on the fundamental choices rather than upon short run solutions. The nuclear debate should be a constant reminder that all panaceas should be suspect.

Recommendation #5

> Energy education should occur throughout the curriculum but the focus should vary with the grade level.

Previous recommendations have dealt with the substance of energy education. But in addition to deciding what should be taught, we must decide where and by whom. It seems pointless to grapple with science educators over who "owns" energy education. There is more than enough for both groups to do. What we can't afford is the inefficiency of duplication.

Science educators should concentrate upon the scientific aspects of energy education. Computing conversion losses, explaining how nuclear fission works, calculating heat transfer, and explaining the process of photovaltaic electrical generation or the natural "st·ff" of science, especially math and physics. It is impossible to rationally discuss the fundamental issues advocated in the previous recommendation without some basic understanding of the technology involved, and who can do that better than science educators.

Energy education in the social studies, on the other hand, should focus upon the social implications of our present situation. The role of government, the morality of disproportionate energy use both within and between nations and generations, the economic and social consequences of selecting various alternatives, a study of the impact of past shifts in major energy sources; all are examples of topics which logically belong in social studies classes.

Energy education in the elementary and middle school grades should be structured around three themes. The first of these is the nature of energy and its role in our daily lives. Energy is so basic, and until recently so inexpensive, that it was easily taken for granted. Elementary teachers can do much to raise the level of youngsters awareness of the sources, forms and uses of energy.

Elementary school is also the logical place to begin dealing with a new energy ethic and its lifestyle implications. While young children may not be big energy users, they can be socialized to view energy in a different way than their parents, much as we try to make them aware of good health habits, the danger of drugs and smoking, etc. Perhaps this is also the place to begin introducing the notion that conservation does not necessarily mean doing with less, just doing differently.[6]

Finally, Egan (1978) speculates that by the middle grades, students are fascinated with details of all sorts; with discovering the range of possibilities offered by their world. If the Egan argument is valid, what better time to introduce the fascinating diversity of alternative energy sources and applications. One need only turn to the ENERGY INSIDER for a host of examples.[7]

Secondary school students should be able to deal with the abstractions necessary when one begins to consider the long terms social consequences of various energy alternatives. As the last few years have so perfectly demonstrated, public officials are reluctant to make policies calling for short term sacrafices when the problems to which they are linked are still ten or fifteen years away.[8] For example, if elected officials succumb to public demands that as much gasoline as the public wants be available at "reasonable prices" they may, in the long run, be committing American youngsters to fighting a war in the Middle East in order to insure that supply. The thrust of the social studies energy curriculum in the upper grades should be to draw upon the analytic and predictive powers of history and the social sciences to expland students' understanding of alternatives and their likely consequences. What makes this so difficult is that our choices are often between two goods, e.g., honoring our commitments to our allies to share petroleum with them in times of shortage or allowing the free market to work in order to allocate resources. What we must work to avoid are over-simplified, dataless discussions. If we can introduce students to a wide range of data and opinions and then help them deal with them in a systematic manner, we will make a unique contribution to their education.

Recommendation #6

> Whenever possible, school systems should locate and adapt existing energy education materials rather than invent their own.

Finally, we should not reinvent the wheel at the school district level. Well developed energy materials abound.[9] School districts should invest their limited resources in locating, selecting and adapting energy education materials. The adaptation process can include local and regional uniqueness and underscore the notion that the more we diversify, the less the failure in one part of the system results in the collapse of the entire system. But before local development gets underway, the question should always be; "Has someone already done this, and can we make it work to meet our needs?"

Summary

The energy issue will not pass quickly from the scene. The situation between now and the turn of the century will get progressively more troublesome as nations compete for a diminishing supply of oil and natural gas. With planning, a willingness to make some quite difficult decisions, and lots of good luck we will make the transition to the next major energy source. Our grandchildren will live with the results of decisions made during the next few years. It is possible that Heilbroner (1974) is right in his gloomy predictions concerning the inability of democratic societies to deal with such difficult choices, but to accept his predictions is to assure them. As social studies educators, we must make our best effort in the energy area, and soon.

NOTES

1. The Foreign Policy Association's, GREAT DECISION: 1978 and GREAT DECISION: 1980 both contain detailed descriptions of our foreign policy alternatives. The League of Women Voter's ENERGY OPTIONS and FACT SHEETS provide some of the details which form the basis for such discussions.

2. There is no shortage of novels speculating about what the world would be like if and when we ever face a major interruption in world oil supplies, e.g., Kenneth M. Cameron, POWER PLAY (Popular Library, New York, 1979), Arthur Haley, OVERLOAD (Doubleday, New York, 1979), Ray Kytle, FIRE AND ICE (McKay, New York, 1975), and Paul Erdman, THE CRASH OF '79 (Simon and Shuster, New York, 1976).

3. Walter Levy's article "Oil and the Decline of the West" is the latest in a long line of well documented pieces warning of the problems which lie ahead.

4. Gasohol provides a good example of how a lack of information can lead to unrealistic expectations. During the campaign of 1980, gasohol is being portrayed as a major way we can break our dependence on foreign oil despite the fact that the Department of Energy projects 1985 production to be 500-600 million gallons, which represents less than 1% of 1980 gasoline consumption. Even investing 40 to 50 billion dollars in oil shale conversion is estimated to produce only 400,000 to 800,000 barrels of synthetic gasoline per day by 1990. (E. F. Lindsley, "Alternative Fuels: How Soon and How Much Will They Help?", POPULAR SCIENCE, October, 1980, pp. 102-103.)

5. TransWorld Airlines estimates that by eliminating one magazine per seat on its planes, it can save $343,000 a year in fuel costs. (ENERGY INSIDER, U.S. Department of Energy, Vol. 3, No. 19, September 15, 1980, p. 1).

6. Shipper (1980) has estimated that Americans could reduce their energy consumption by 30% to 40% without lowering their standard of living. Industry has already demonstrated that major reductions can be achieved in energy consumption without lowering production, e.g., INDUSTRIAL ENERGY CONSERVATION: 101 IDEAS THAT WORK, General Motors, Detroit, Michigan, 1977.

7. ENERGY INSIDER is a free by-weekly newsletter describing a wide range of energy related activities. Write: ENERGY INSIDER, DOE, Mail Stop 1E-218, Washington, DC 20585 to be placed on the mailing list.

8. William Tucker (1980) argues that the continued love affair between Americans and big cars is to be blamed upon a Congress unwilling to decontrol oil prices rather than upon the auto manufacturers' unwillingness to make small cars available to consumers.

9. Professional periodicals are beginning to devote space to the topic of energy education. The April 1980 issue of SOCIAL EDUCATION, journal of the National Council for the Social Studies, contains a large section on energy education and the entire Winter 1980 issue of the California Council's SOCIAL STUDIES REVIEW is devoted to the topic.

REFERENCES

Allen, Rodney F. ENERGY EDUCATION: GOALS AND PRACTICES, (Fastback #139), Phi Delta Kappa, Bloomington, Indiana, 1980.

Biological Services Curriculum Study, ENERGY AND SOCIETY: INVESTIGATIONS IN DECISION MAKING, Hubbard, P. O. Box 104, Northbrook, Illinois; 1977.

Brown Harrison, "Day of Reckoning: Resilient Poor Versus Vulnerable Rich?", R. F. ILLUSTRATED, Vol. 3, No. 2, 1+, December 1976.

California Council for the Social Studies, "Running on Empty," SOCIAL STUDIES REVIEW, Vol. 19, No. 2, entire issue, Winter 1980.

Commoner, Barry, "Reflections: The Solar Transition, Parts I and II," THE NEW YORKER, April 23, 1979, pp. 53+ and April 30, 1979, pp. 46+.

Eagan, Kieran, "The Student and the Secondary Social Studies Curriculum," THEORY AND RESEARCH IN SOCIAL EDUCATION, Vol. 6, No. 4, December 1978, pp. 1-19.

Eckholm, Eric, THE OTHER ENERGY CRISIS: FIREWOOD, Worldwatch Paper #1, Worldwatch Institute, Washington, DC, 1976.

"Energy, Living in a Fool's Paradise?", U.S. NEWS AND WORLD REPORT, May 1, 1978.

Gail, Bridget, "The West's Juglar Vein: Arab Oil," ARMED FORCES JOURNAL INTERNATIONAL, pp. 18-32, August, 1978.

Hanvey, Robert G., AN ATTAINABLE GLOBAL PERSPECTIVE, Center for War/Peace Studies, New York, 1975.

Indiana Department of Public Instruction, AN ENERGY CURRICULUM FOR THE ELEMENTARY GRADES, Indianapolis, Indiana, 1979.

Keyfitz, Nathan, "World Resources and the Middle Class," SCIENTIFIC AMERICAN, Vol. 235, No. 1, July 1976, pp. 28-35.

Hardy, Sheela, HUCKSTERS IN THE CLASSROOM, Center for Responsive Law, Washington, DC, 1979.

Hayes, Dennis, NUCLEAR POWER: THE FIFTH HORSEMAN, Worldwatch Paper #6, Worldwatch Institute, Washington, DC, 1976.

Hayes, Dennis, RAYS OF HOPE: THE TRANSITION TO A POST-PETROLEUM WORLD, W. W. Norton and Company, Ind., New York, 1977.

Heilbroner, Robert L., AN INQUIRY INTO THE HUMAN PROSPECT, W. W. Norton and Company, Inc., 1974.

League of Women Voters, ENERGY DILEMMAS, League of Women Voters Education Fund, Washington, DC, 1977.

League of Women Voters, ENERGY OPTIONS, League of Women Voters Education Fund, Washington, DC, 1977.

Levy, Walter, "Oil and the Decline of the West," FOREIGN AFFAIRS, Vol. 58, Summer, 1980, pp. 999-1015.

Lindholm, R. C., "The Oil Shortage--A Story Geologists Should Tell," JOURNAL OF GEOLOGICAL EDUCATION, Vol. 28, 1980, pp. 36-45.

Lovins, Amory B., SOFT ENERGY PATHS: TOWARD A DURABLE PEACE, Ballinger Publishing Co., Cambridge, Massachusetts, 1977.

Marker, Gerald W., "What Educators Know and Believe About Energy," THE SOCIAL STUDIES, in press, 1980.

Murray, Francis X.. ENERGY: A NATIONAL ISSUE, The Center for Strategic and International Studies, Georgetown University, Washington, DC, 1976.

National Council for the Social Studies, "Teaching About the Energy Crisis," SOCIAL EDUCATION, Vol. 44, No. 4, April 1980, pp. 259-291.

National Science Teachers Association, INTERDISCIPLINARY STUDENT/TEACHER MATERIALS IN ENERGY, THE ENVIRONMENT, AND THE ECONOMY, U.S. Department of Energy, Washington, DC, 1978.

Posthuma, Frederick E. (ed), ENERGY AND EDUCATION: TEACHING ALTERNATIVES, National Education Association, Washington, DC, 1978.

Rask, Norman, "Agricultural Resources for Food or Fuel: Policy Intervention or Market Choice?", QUARTERLY REPORT, Mershon Center, The Ohio State University, Vol. 5, No. 2, Winter 1980.

Rosa, Eugene, "The Public and the Energy Problem," BULLETIN OF THE ATOMIC SCIENTISTS, April 1978, pp. 5-7.

Shipper, Lee, "Conservation is Here," THE BULLETIN, February 1980, pp. 55-59.

Stobaugh, Robert and Yergin, Daniel (eds.), ENERGY FUTURE: REPORT OF THE ENERGY PROJECT AT THE HARVARD BUSINESS SCHOOL, Random House, New York, 1979.

Tucker, William, "The Wreck of the Auto Industry," HARPERS, November, 1980, pp. 45-60.

Yergin, Daniel, "The Real Meaning of the Energy Crunch," THE NEW YORK TIMES MAGAZINE, June 4, 1978, pp. 32+.